PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Jia-Hung Tsai	
Examiner:	Dudding, Alfred E	
Conf. No.:	2270	
Filing Date:	09/18/2003	Art Unit: 2853
Serial No.:	10/605,271	Docket No.: ACMP0121USA

Title: Improved Method of Maintaining Edge Quality in Ink Jet Printing

To: Commissioner for Patents
P.O. BOX 1450
Alexandria, VA 22313-1450

Subject: Response to the Office Action dated 06/23/2004

Dear Sir:

INTRODUCTORY COMMENTS

In response to the Office action identified above, the above-identified application is to be amended as indicated in the following sections.

AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0033] with the following paragraph:

Step ~~50~~ 80: Start the process for printing a color source image;

Please replace paragraph [0034] with the following paragraph:

Step ~~52~~ 82: Perform a color conversion operation on the source image. This conversion typically involves converting red, green, and blue (RGB) colors into cyan, magenta, yellow, and black (CMYK). However, the source image can also be converted into other colors. Colors such as light cyan, light magenta, orange, and green can also be used. At this point, the source image is a continuous tone source image, meaning that the image is represented by a high number of colors, which approximates an unlimited variety of colors;

Please replace paragraph [0035] with the following paragraph:

Step ~~54~~ 84: Pixel altering processing is performed on the source image;

Please replace paragraph [0036] with the following paragraph:

Step ~~56~~ 86: Convert the altered source image into a plurality of halftone images. For example, a color plane is produced for each of the CMYK colors, producing four halftone images;

Please replace paragraph [0037] with the following paragraph:

Step ~~58~~ 88: The halftone images are printed; and

Please replace paragraph [0038] with the following paragraph:

Step ~~60~~ 90: End.

Please replace paragraph [0039] with the following paragraph:

As shown in steps ~~54 and 56~~ 84 and 86 above, the pixel altering for reducing intercolor bleeding is performed on the source image. After the pixel altering process, the source image is then converted into the halftone images. Like the prior art method, the present invention method corrects intercolor bleeding along a border between two different colors of ink. For instance, suppose that black pigment-based ink is used as a first color and either cyan, magenta, or yellow dye-based ink is used as a second color. Since the pigment-based ink and the dye-based ink have different properties, and dry at different rates, the two ink colors may bleed together unless pixel altering processes such as reduction and replacement are used.

AMENDMENTS TO THE CLAIMS

1 (currently amended): A method of processing color image data for printing on a color ink jet printer, the method comprising:

reading color image data from a continuous tone source image, the continuous tone source image containing color image data of at least a first color area and a second color area;

identifying a border region between the first color area and the second color area;

performing a pixel altering function to alter pixels of the continuous tone source image along the border region between the first color area and the second color area;

converting the continuous tone source image into a plurality of halftone images after performing the pixel altering function; and

printing the halftone images using ink of the first and second colors according to the first and second color areas.

2 (original): The method of claim 1 wherein the first color ink and the second color ink are two different types of ink.

3 (original): The method of claim 2 wherein the first color ink is a pigment-based ink and the second color ink is a dye-based ink.

4 (original): The method of claim 1 wherein the first color is black and the second color is selected from a group consisting of cyan, magenta, yellow, light cyan, light magenta, orange, and green.

5 (original): The method of claim 4 wherein the first color ink is a pigment-based ink and the second color ink is a dye-based ink.

6 (original): The method of claim 1 wherein the pixel altering function comprises replacing pixels of the first color with pixels of another color.

7 (original): The method of claim 1 wherein the pixel altering function comprises replacing pixels of the second color with pixels of another color.

8 (original): The method of claim 1 wherein the pixel altering function comprises reducing a color saturation value for pixels of the first color.

9 (original): The method of claim 1 wherein the pixel altering function comprises reducing a color saturation value for pixels of the second color.

10 (original): The method of claim 1 further comprising calculating a first density of pixels of the first color, a second density of pixels of the second color, and comparing the first density to the second density.

11 (original): The method of claim 10 further comprising identifying the border region between the first color area and the second color area only if the first density and the second density match predetermined criteria which necessitates altering pixels along the border.

12 (original): The method of claim 11 wherein if the first density is higher than the second density, the pixels along the border region are altered according to a comparison result between the first density and a first threshold level.

13 (original): The method of claim 11 wherein if the second density is higher than the first density, the pixels along the border region are altered according to a comparison result between the first density and a second threshold level.

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings contain changes to Fig.6 and Fig.7. These sheets replace the original Fig.6 and Fig.7.

In Fig.6., reference characters 52, 54, 56, 58, and 60 have been renumbered as reference characters 82, 84, 86, 88, and 90, respectively. Corresponding changes have also been made to the specification.

In Fig.7, an exit from decision block 106 has been removed. The only exits remaining from decision block 106 are the Yes and No exits.

No new matter has been added through the changes to the drawings.

Attachment: Two Replacement Sheets
Two Annotated Sheets Showing Changes

REMARKS

The drawings are objected to. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Rylander (US 5,602,572). Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Gunther et al (US 6,705,702). Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Torpey et al (US 6,290,330). Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Barton et al. (US 5,861,896). Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Torpey et al. (US 6,348,847). Claims 11-13 are objected to as being dependent on a rejected base claim.

1. Objection to the drawings:

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 52, 54, 56, 58, and 60 have been used to designate both a printing window, columns, and steps for a printing algorithm. In Fig.7, reference character 106, decision block, contains one entrance and three exits. This type of block has "yes" or "no" exits only.

Response:

As explained in the Amendments to the Drawings section above, replacement sheets for both Fig.6 and Fig.7 are enclosed to correct the errors with the drawings. No new matter has been added. Corresponding changes have also been made to the specification, as shown in replacement paragraphs [0033] to [0039].

2. Rejection of claims 1, 2, and 4 under 35 U.S.C. 103(a):

Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Rylander (US 5,602,572) for reasons of record, as recited on pages 2-3 of the above-indicated Office action.

Response:

Claim 1 has been amended to overcome this rejection. The amendments more clearly distinguish the claimed invention from the Torpey ('144) and Rylander patents. Torpey ('144) and Rylander both teach altering pixels a halftone image before printing for reducing intercolor bleeding.

On the other hand, the present invention alters pixels in a source color image before converting the source image into a plurality of halftone images to be printed. By altering the pixels of a source image, memory and computation savings are realized. To more clearly define the invention recited in claim 1, the term "source image" has been replaced with "continuous tone source image". A corresponding change in the specification has also been made in paragraph [0034] for explaining the terms used in claim 1.

This amendment to claim 1 is inherently supported in paragraph [0034] of the specification. In paragraph [0034, the source image is converted from an RGB color image to a CMYK color image. Since the image is composed of the basic colors needed to create a color image, the image can be thought of as a continuous source image. The continuous source image contains a high number of colors, which approximates an unlimited number of colors having a continuous change in color among them.

Claim 1 contains two separate limitations that each differ from the teachings of Torpey ('144) and Rylander. First of all, neither patent teaches "performing a pixel altering function to alter pixels of the continuous tone source image along the border region between the first color area and the second color area". Instead, each patent teaches altering pixels in a halftone image. Furthermore, neither patent teaches "converting the continuous tone source image into a plurality of halftone images after performing the pixel altering function". Instead, the patents teach converting images to halftone images **before** altering pixels.

Although Torpey ('144) and Rylander teach altering pixels in a halftone image, the halftone image is considerably different from a continuous tone source image. The continuous tone source image is a color image that contains a large number of colors. The halftone image contains monochromatic dots of varying densities, and does not read on either a color source image or a continuous tone source image.

As disclosed in paragraphs [0052] to [0055] of the specification, the method recited in claim 1 offers savings in both memory and required calculations needed to perform the pixel alteration process over that of the prior art method. Therefore performing pixel altering on the continuous tone source image provides significant advantages over the methods taught by Torpey ('144) and Rylander.

Since neither Torpey ('144) nor Rylander teach performing a pixel altering function to alter pixels of the continuous tone source image, either alone or in combination, claim 1 is patentably distinct from Torpey ('144) and Rylander. Claims 2 and 4 are dependent on claim 1, and should be allowed if claim 1 is allowed. Reconsideration of claims 1, 2, and 4 is respectfully requested.

3. Rejection of claims 3 and 5 under 35 U.S.C. 103(a):

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Gunther et al (US 6,705,702) for reasons of record, as recited on pages 3-4 of the above-indicated Office action.

Response:

Claims 3 and 5 are dependent on claim 1, and should be allowed if claim 1 is allowed. Reconsideration of claims 3 and 5 is requested.

4. Rejection of claims 6 and 7 under 35 U.S.C. 103(a):

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Torpey et al (US 6,290,330) for

reasons of record, as recited on page 4 of the above-indicated Office action.

Response:

Claims 6 and 7 are dependent on claim 1, and should be allowed if claim 1 is allowed. Reconsideration of claims 6 and 7 is requested.

5. Rejection of claims 8 and 9 under 35 U.S.C. 103(a):

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Barton et al. (US 5,861,896) for reasons of record, as recited on pages 4-5 of the above-indicated Office action.

Response:

Claims 8 and 9 are dependent on claim 1, and should be allowed if claim 1 is allowed. Reconsideration of claims 8 and 9 is requested.

6. Rejection of claim 10 under 35 U.S.C. 103(a):

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey et al (US 6,361,144) in view of Torpey et al. (US 6,348,847) for reasons of record, as recited on page 5 of the above-indicated Office action.

Response:

Claim 10 is dependent on claim 1, and should be allowed if claim 1 is allowed. Reconsideration of claim 10 is requested.

Respectfully submitted,

5 _____ Date: 9/16/2004

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(Please contact me by e-mail if you need a telephone communication and I will return your call promptly)

Annotated Sheet Showing Changes

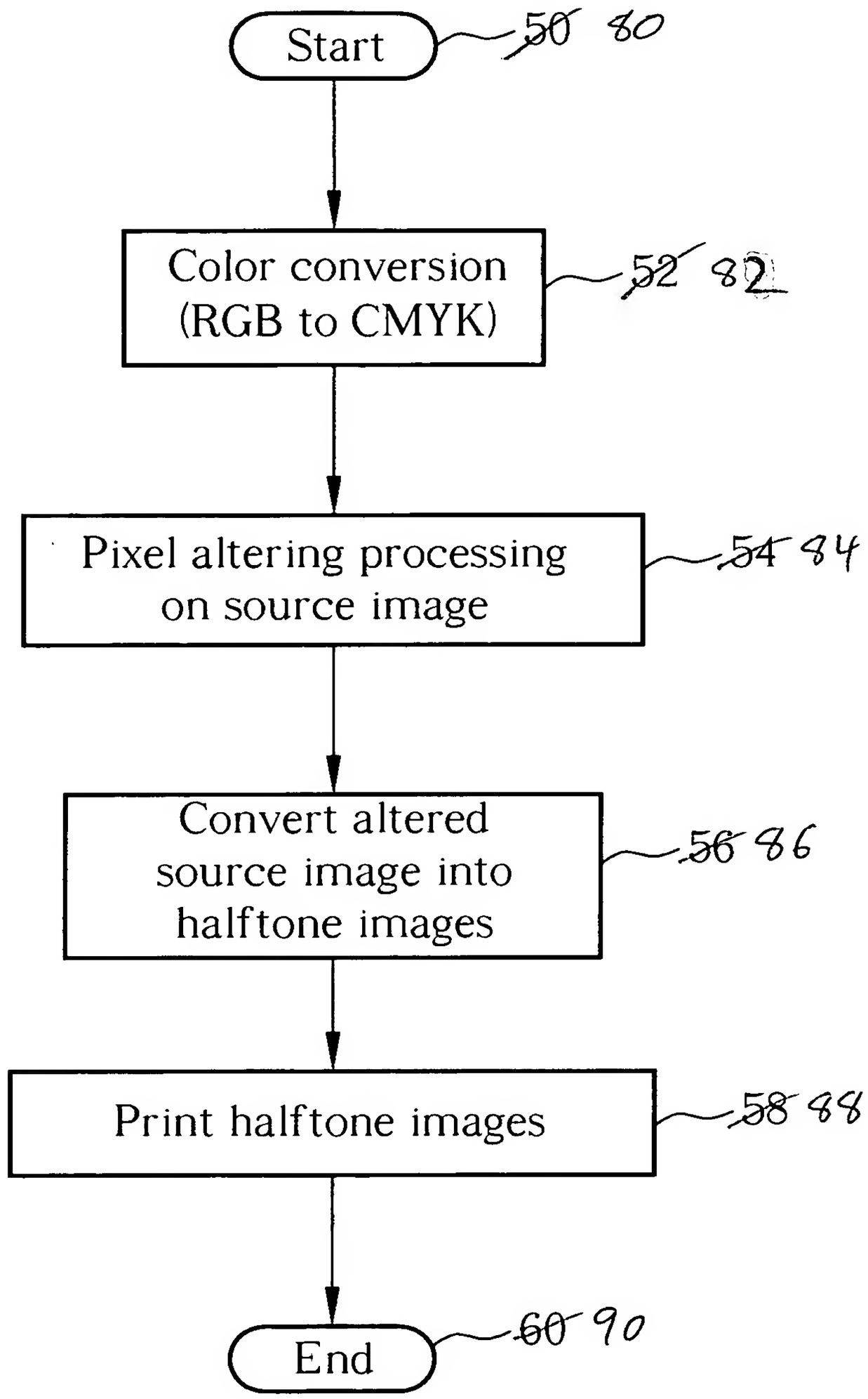

Fig. 6

Annotated Sheet Showing Changes

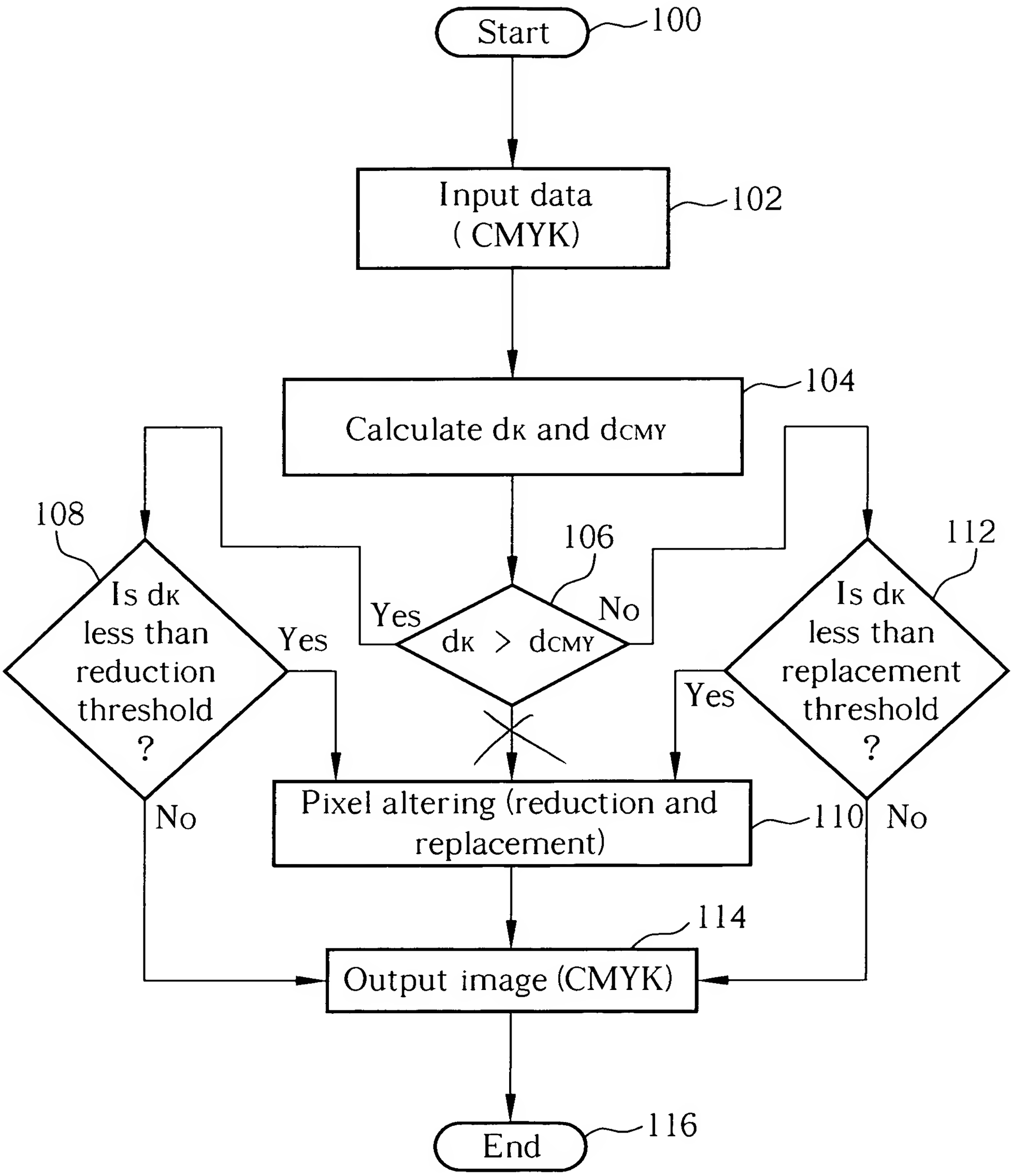

Fig. 7

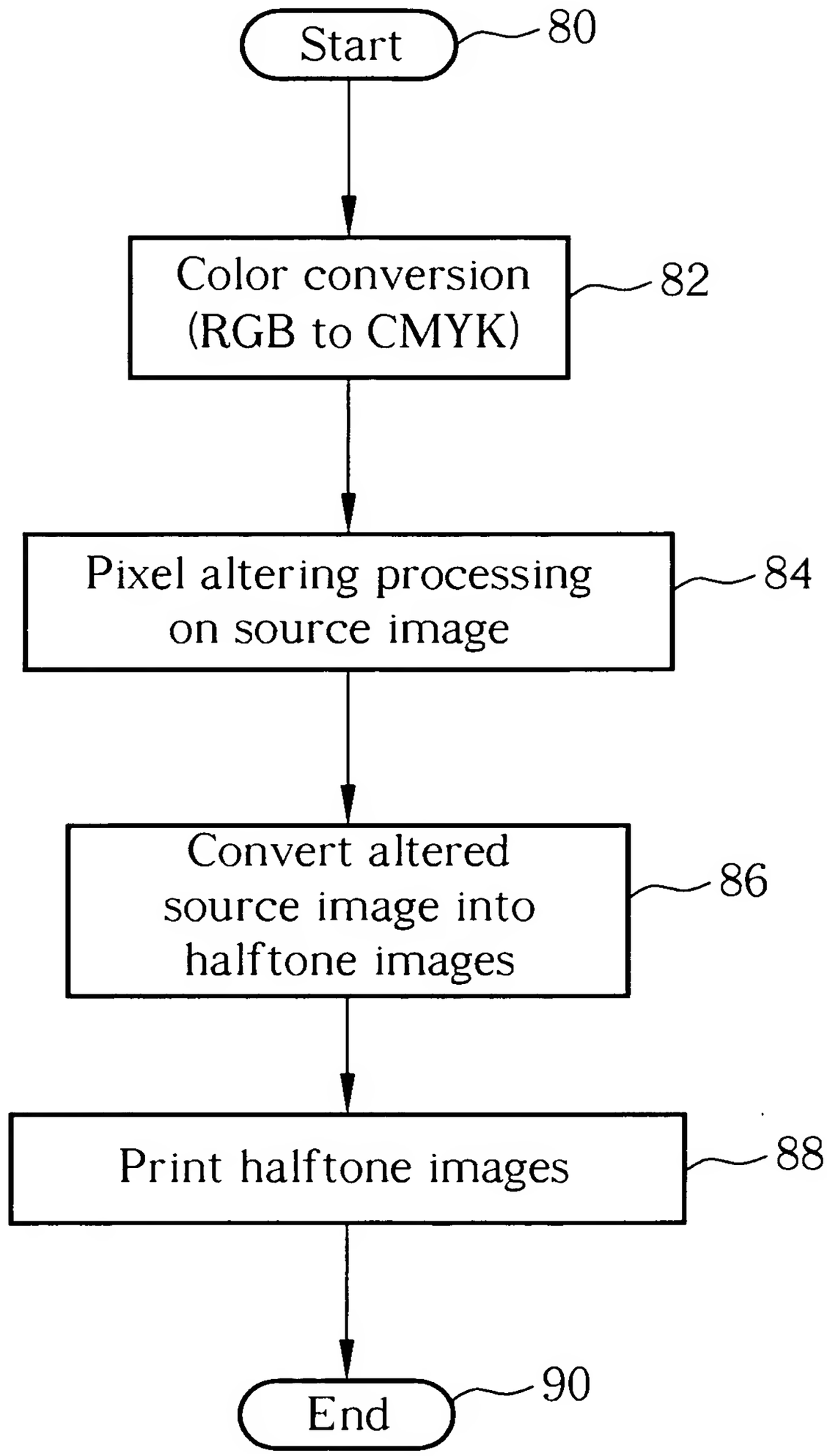
Start
80
Color conversion
(RGB to CMYK)
82
Pixel altering processing
on source image
84
Convert altered
source image into
halftone images
86
Print halftone images
88
End
90

Fig. 6

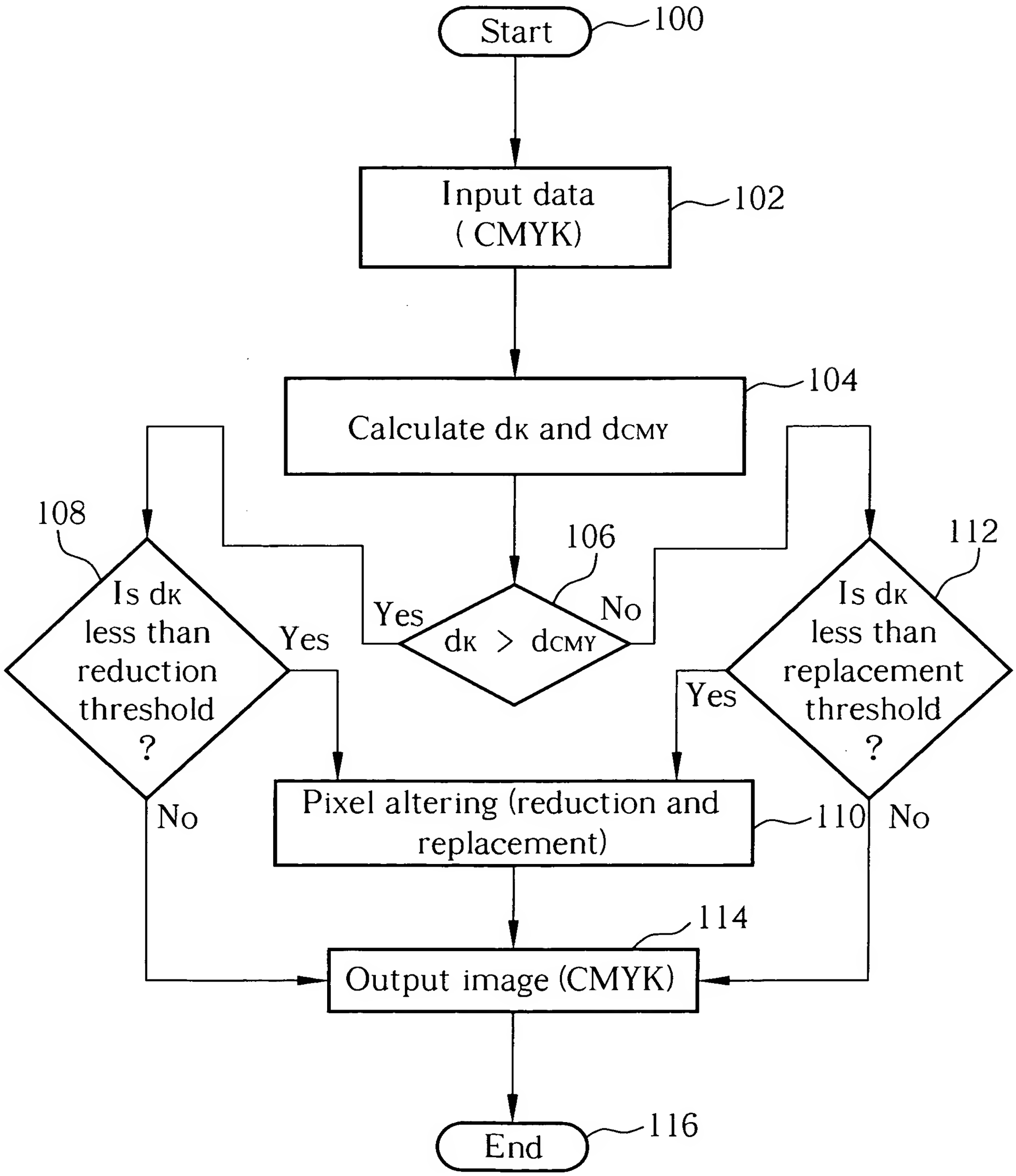
Start
100
Input data
(CMYK)
102
Calculate dK and dCMY
104
108
Is dK
less than
reduction
threshold
?
Yes
No
106
Yes
No
dK > dCMY
112
Is dK
less than
replacement
threshold
?
Yes
No
Pixel altering (reduction and
replacement)
110
114
Output image (CMYK)
End
116

Fig. 7

JFW

PTO/SB/21 (02-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

		Application Number	10/605,271
		Filing Date	09/18/2003
		First Named Inventor	Jia-Hung Tsai
		Art Unit	2853
		Examiner Name	DUDDING, ALFRED E
Total Number of Pages in This Submission	17	Attorney Docket Number	ACMP0121USA

ENCLOSURES *(Check all that apply)*

- ☑ Fee Transmittal Form
- ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☑ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
- ☐ After Allowance communication to Technology Center (TC)
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Winston Hsu, Reg. No.: 41,526
Signature	Winston Hsu
Date	9/16/2004

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

Typed or printed name			
Signature		Date	

PTO/SB/17 (10-03)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 0.00

Complete if Known	
Application Number	10/605,271
Filing Date	09/18/2003
First Named Inventor	Jia-Hung Tsai
Examiner Name	DUDDING, ALFRED E
Art Unit	2853
Attorney Docket No.	ACMP0121USA

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☑ Deposit Account:

Deposit Account Number: 50-3105

Deposit Account Name: North America Intellectual Property Corp.

The Director is authorized to: *(check all that apply)*

☑ Charge fee(s) indicated below ☑ Credit any overpayments

☑ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below		Fee Paid
Total Claims		-20** =		X	=	
Independent Claims		- 3** =		X	=	
Multiple Dependent					=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 0.00

SUBMITTED BY

(Complete *(if applicable)*)

Name (Print/Type)	Winston Hsu	*Registration No. (Attorney/Agent)*	41,526	*Telephone*	886289237350
Signature				*Date*	9/16/2004

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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